dures is available. 3D reconstruction capability is another major advantages of this unique, new technology now in a multicenter clinical trial.

1095-159 Accuracy of MRI Evaluation of Pulmonary Blood Supply in Patients With Complex Pulmonary Stenosis or Atresia

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Background: Detailed imaging of pulmonary artery (PA) anatomy and significant aortopulmonary collaterals (APCs) is crucial for surgical planning and follow-up in pts with complex congenital heart disease and pulmonary stenosis (PS) or atresia (PAtr). Because examination by echo is often technically limited, this study evaluated the utility of MRI as an alternate non-invasive imaging tool.

Methods: Ten pts (median age 31 yrs, range 1–4 yrs) with poor echo windows underwent both cardiac catheterization (Cath) and MRI within a median of 3 mos (range 0.1–8 mos). Diagnoses included TOF/PAtr (n = 6), TOF/PS (n = 2), single ventricle with PAtr (n = 1) and heterotaxy syndrome with PS (n = 1). MRI was performed using ECG-gated spin echo and gradient echo sequences in standard and oblique imaging planes. Data were retrospectively evaluated using angiography at Cath as the reference standard.

Results: MRI had 100% sensitivity and specificity for the diagnosis of main PA (n = 5) and branch PA hypoplasia or stenosis (n = 11), as well as discontinuous PAs (n = 3). There was complete agreement between MRI and Cath identification of significant APCs (n = 6). Main PA atresia was noted by MRI in 4 pts but was not definitively shown by Cath in any. MRI but not Cath precisely defined the distance between discontinuous PAs and their relationship to other mediastinal structures. MRI and Cath evaluation of aortopulmonary or Glenn shunt patency was concordant in all cases (n = 4).

Conclusion: Cardiac MRI is a reliable non-invasive imaging modality to define PA and APC anatomy in pts with complex PS or PAtr.

1095-160 Noninvasive Automated Assessment of the Ratio of Pulmonary to Systemic Flow in Atrial Septal Defects by Spatio-temporal Integration of Doppler Velocity Profile

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Background: Conventional pulsed Doppler echocardiographic determination of the pulmonary to systemic blood flow (Qp/Qs) ratio in patients (pts) with atrial septal defect (ASD) requires calculation of pulmonary and aortic luminal areas and integrals of the Doppler velocity wave form which are time-consuming process. Recent introduction of automated cardiac output measurement (ACOM) method provides quick and accurate automated calculation of cardiac output by spatio-temporal integration of Doppler velocity profile. In this study, we applied this new method to noninvasive automated determination of Qp/Qs by ACOM in pts with ASD.

Methods: We studied 15 pts with ASD who underwent cardiac catheterization by color Doppler echocardiography. We evaluated Qp and Qs by ACM method. Qp was automatically calculated by setting a region of interest (ROI) on the pulmonary annulus in the parasternal short-axis view. The calculation of Qs was automatically performed by setting a ROI on the aortic annulus in the apical long-axis view. At the time of catheterization, Qp/Qs was assessed by oximetry. The Qp/Qs ratio determined by ACM method was compared with that by oximetry.

Results: The Qp/Qs ratio determined by ACM method correlated well with the oximetric Qp/Qs ratio ($r = 0.93$, $y = 0.83x + 0.15$).

Conclusion: New and simplified ACOM method appears promising for the accurate noninvasive automated assessment of the Qp/Qs ratio in pts with ASD.

1096 Neurohormonal Predictors and Interventions in Heart Failure

Tuesday, March 31, 1998, 9:00 a.m.–11:00 a.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 10:00 a.m.–11:00 a.m.

1096-29 Superoxide Anion Generation by Neutrophils Correlates With NYHA Status in Chronic Heart Failure

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Background: Oxidative stress is increased in chronic heart failure (CHF) but the mechanism underlying this process is unclear. Neutrophil production of free radicals in particular superoxide anion (O_2^-) may be an important source of free radical generation in this disease. Employing a chemiluminescent technique we measured O_2^- generation by neutrophils via the NADPH/NADH oxidase system from patients with CHF and correlated these findings with clinical NYHA status.

Methods: We studied 10 CHF patients and 10 matched, healthy controls. Neutrophils were separated from venous blood samples and their ability to generate O_2^- detected utilising lucigenin in a standard chemiluminescent assay. The neutrophils were stimulated with N-formyl-met-leu-phe. Both the peak level of O_2^- production and the slope of the rise to this peak were measured.

Results: Peak levels of O_2^- generation and the slope of the rise to this peak were significantly greater in CHF patients (59.99 [SEM 11.13] v. 20.84 [SEM 2.62], $p < 0.005$ and 1.03 [SEM 0.19] v. 0.30 [SEM 0.05], $p < 0.005$, respectively). A good correlation was shown between peak O_2^- levels and NYHA status in the patients ($r = 0.78$, $p < 0.05$).

Discussion: This study supports the hypothesis that neutrophils contribute importantly to increased oxidative stress in CHF. The mechanism of the enhanced O_2^- generating ability of neutrophils remains to be determined. Tumour necrosis factor alpha (TNF α) has been shown to prime neutrophils in rheumatoid arthritis and is increased in heart failure, particularly when severe. TNF α and/or angiotensin II may be important in mediating increased superoxide anion generation in CHF.

1096-30 Prognostic Value of Circulating Levels of Interleukin-6 in Patients With Congestive Heart Failure

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To assess the prognostic value of increased plasma interleukin-6 (IL-6) 46 patients (Pts) with congestive heart failure (CHF), (mean age 52 ± 9 years) were studied. Plasma neurohormones, plasma IL-6, ejection fraction (EF), end-diastolic (EDL) and end-systolic (ESL) left ventricular lengths were assessed. The EF, EDL and ESL were reassessed at 6 months of follow-up.

Mean EF of the studied population was 25 ± 6%. Plasma IL-6 was higher >5 pg/ml (H-IL-6) in 26 Pts while it was in the normal range in the remaing 20. Pts with H-IL-6 had higher incidence of NYHA functional class (FC) III–IV (61% vs 20%, p = 0.005). There were no differences regarding basal EF, EDL and ESL between patients with normal or H-IL-6. However, at 6 months, Pts with H-IL-6 had lower EF and larger EDL and ESL than their counterparts.

	EF (%)	EDL (mm)	ESL (mm)
Normal-IL-6	38 ± 14	64 ± 9	49 ± 10
H-IL-6	27 ± 8*	71 ± 7**	57 ± 9**

*p = 0.03, **p = 0.01

Atrial natriuretic peptide and plasma renin activity were higher in Pts with H-IL-6 (57 ± 53 vs 31 ± 18, p = 0.03 and 5.3 ± 2 vs 1.8 ± 7, p = 0.04, respectively). During follow-up (36 ± 6 m.) 2 Pts died and 10 had CHF. Pts with H-IL-6 had higher incidence of events (42% vs 5%, p = 0.001). Multivariate analysis identified FC III–IV (p = 0.002) and plasma IL-6 (p = 0.05) as independent predictors of prognosis. In conclusion, in Pts with CHF: 1/ H-IL-6 was associated with lower EF and larger EDL and ESL at 6 months. 2/ Plasma IL-6 was identified as an independent predictor of prognosis.

1096-31 Plasma Leptin Levels in Chronic Heart Failure: Role of Hyperinsulinemia and Insulin Resistance

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Background: Leptin, a product of the obese (ob) gene, increases energy expenditure. In chronic heart failure (CHF), a hypercatabolic state, leptin concentrations relate positively to energy expenditure. Insulin increases leptin production and CHF is a hyperinsulinemic state. We considered that in CHF, plasma leptin levels might relate to plasma insulin and insulin sensitivity (Si).

Methods: Male patients with CHF (n = 22, aged 60.5 ± 2.3, LVEF 22 ± 4%, mean ± SEM) and 10 healthy controls, matched for age and both total (TBF) and regional body fat (dual energy X-ray absorptiometry), underwent measurement of fasting plasma leptin (RIA) and an i.v. glucose tolerance test (IVGTT).

Results: Compared to controls, CHF patients had 46% higher fat-adjusted plasma leptin levels (p = 0.029), 59% higher IVGTT insulin levels (p = 0.036) and a 66% lower Si (p = 0.002). In the CHF group, plasma leptin levels correlated with fasting insulin ($r = 0.74$, $p < 0.001$), IVGTT insulin ($r = 0.70$, p

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